What is claimed is:

1. A pressure sensing device comprising:

a substrate having a fluorescent region;

a shell having an outer surface and an inner surface;

a beam affixed to the inner surface of the shell by two posts;

a first light transporter having a distal end and an end proximate the outer surface of the shell in an area adjacent the beam and the fluorescent region; and

a second light transporter having a distal end and an end proximate the outer surface of the shell in an area adjacent the beam and the fluorescent region.

2. The device of claim 1, further comprising a sensor circuit in communication with the distal end of the second light transporter.

3. The device of claim 1, wherein the substrate includes a photodiode illuminated by light from the first light transporter to excite the beam into vibration.

4. The device of claim 1, wherein the shell and the beam are at least partially light transmissive so that light from the first light transporter reaches the photodiode.

5. The device of claim 1, wherein the fluorescent region is responsive to a first light wave of a first wavelength from the first light transporter to generate a second light wave having a second wavelength, and wherein the second light wave is transmitted by the second light transporter.

6. The device of claim 1, wherein the substrate includes a photodiode illuminated by a first light wave of a first wavelength from the first light transporter to excite the beam into vibration, wherein the fluorescent region is responsive to the first light wave to generate a second light wave having a second wavelength, and wherein the second light wave has a property dependent upon a frequency of vibration of the beam and is transmitted by the second light transporter.

7. The device of claim 1, wherein the fluorescent region comprises erbium.

8. The device of claim 7, wherein the fluorescent region is illuminated by a light signal from the first light transporter having a wavelength of 900 nm.

9. The device of claim 1, wherein the shell defines an evacuated cavity enclosing the beam and the

fluorescent region.

10. The device of claim 1, wherein the beam is excited to resonance based upon a photodiode.

11. The device of claim 1, wherein the substrate supports the shell and the beam.

12. The device of claim 1, wherein the shell, the beam and the substrate are micromachined.

13. The device of claim 1, wherein the device is used to sense pressure within an organism.

14. The device of claim 1, wherein the first and second light transporters are optical fibers.

15. The device of claim 1, wherein the first and second light transporters are optical waveguides.

16. A method for sensing pressure using a vacuum cavity device having at least one fluorescent region and a pressure sensitive resonant beam, the method comprising:

directing a first light wave toward the pressure sensitive resonant beam and the fluorescent region;

exciting the pressure sensitive resonant beam to a

resonant frequency in response to the first light wave; and

transmitting away from the pressure sensitive resonant beam a second light wave generated by the fluorescent region in response to the first light wave, the first and second light waves having different wavelengths, the second light wave having a property corresponding to the resonant frequency of the pressure sensitive resonant beam.

17. The method of claim 16, further comprising evaluating the second light wave in a sensor circuit.

18. The method of claim 16, wherein the exciting of the pressure sensitive resonant beam comprises directing the first light wave to a photodiode mounted proximate to the pressure sensitive resonant beam.

19. The method of claim 16, wherein the fluorescent region comprises erbium.

20. The method of claim 16, wherein the first light wave has a wavelength of 900 nm.

21. The method of claim 16, wherein the shell, the pressure sensitive resonant beam and the substrate are micromachined.

22. The method of claim 21, further comprising measuring pressure in a region of the human body as a function of the second light wave.

23. An optically powered integrated microstructure remote pressure sensor comprising:

a substrate supporting a polysilicon shell having an outer surface and an inner surface, the inner surface defining an evacuated cavity enclosing an area of the substrate, the substrate being provided with a fluorescent region;

a microbeam affixed to the inner surface of the shell within the evacuated cavity by two spaced apart posts, the microbeam disposed in the vicinity of the substrate;

a photodiode integrated into the substrate at a surface location beneath the microbeam;

a first light transporter having a distal end and a proximate end, the proximate end of the first optical fiber being disposed adjacent the outer surface of the shell to direct light from the first optical fiber to the photodiode and to the fluorescent region; and

a second light transporter having a distal end and a proximate end, the proximate end of the second light transporter being disposed at the outer surface of the shell so as to transmit light emitted by the fluorescent region, wherein the transmitted light indicates a frequency of vibration of the beam.

24. The sensor of claim 23, further comprising sensor electronics receiving, through the distal end of the second light transporter, the light wave generated by the fluorescent region.

25. The sensor of claim 23, wherein the light received by fluorescent region from the first light transporter has a wavelength of 900 nm.

26. The sensor of claim 23, wherein the microbeam is excited to resonance by the photodiode.

27. The sensor of claim 23, wherein excitation of the microbeam comprises directing the first light wave onto the photodiode.

28. The sensor of claim 23, wherein the shell, the microbeam and the substrate are micromachined.

29. The sensor of claim 23, wherein the sensor measures pressure within the human body.

30. The sensor of claim 23, wherein the first and second light transporters are optical fibers.

31. The sensor of claim 23, wherein the first and second light transporters are optical waveguides.

32. A pressure sensing device comprising:

a substrate having a photodiode and a fluorescent region;

a shell having an outer surface and an inner surface;

a beam affixed to the inner surface of the shell by two posts; and

a light transporter having a distal end and an end proximate the outer surface of the shell in an area adjacent the beam and the fluorescent region.

33. The device of claim 32, wherein the fluorescent region comprises erbium.

34. The device of claim 33, wherein the fluorescent region is illuminated by a light signal having a wavelength of 900 nm.

35. The device of claim 32, wherein the shell defines an evacuated cavity enclosing the beam and the fluorescent region.

36. The device of claim 32, wherein the beam is

excited to resonance based upon the photodiode.

37. The device of claim 32, wherein the shell, the microbeam and the substrate are micromachined.

38. The device of claim 32, wherein the device is used to sense pressure within an organism.

39. The device of claim 32, wherein the shell and the beam are at least partially light transmissive so that light from the light transporter reaches the photodiode.

40. The device of claim 32, wherein the light transporter is an optical fiber.

41. The device of claim 32, wherein the light transporter is an optical waveguide.

42. A pressure sensing device comprising:

a substrate having a photodiode and a fluorescent region;

a shell having an outer surface and an inner surface; and

a beam affixed to the inner surface of the shell by two posts.

43. The device of claim 42, wherein the photodiode is illuminated by a light to excite the beam into vibration.

44. The device of claim 42, wherein the shell and the beam are at least partially light transmissive so the light reaches the photodiode.

45. The device of claim 42, wherein the fluorescent region is responsive to a light of a first wavelength to generate a second light having a second wavelength, and wherein the second light has a property dependent upon a frequency of vibration of the beam.

46. The device of claim 42, wherein the fluorescent region comprises erbium.

47. The device of claim 42, wherein the fluorescent region is illuminated by a light having a wavelength of 900 nm.

48. The device of claim 42, wherein the shell defines an evacuated cavity enclosing the beam and the fluorescent region, and wherein the substrate supports the shell and the beam.

49. The device of claim 42, wherein the shell, the

beam and the substrate are micromachined.

50. The device of claim 42, wherein the device is used to sense pressure within an organism.

51. An optically powered integrated microstructure remote pressure sensor comprising:

a substrate supporting a polysilicon shell having an outer surface and an inner surface, the inner surface defining an evacuated cavity enclosing an area of the substrate, the substrate being provided with a fluorescent region;

a microbeam affixed to the inner surface of the shell within the evacuated cavity by two spaced apart posts, the microbeam disposed in the vicinity of the substrate;

a photodiode integrated into the substrate at a surface location beneath the microbeam; and

a light transporter having a distal end and a proximate end, the proximate end being disposed adjacent the outer surface of the shell to direct light to the photodiode and to the fluorescent region, and to receive a light wave emitted by the fluorescent region, wherein the transmitted light indicates a frequency of vibration of the beam.

52. The sensor of claim 51, further comprising sensor electronics receiving, through the distal end of the light transporter, the light wave emitted by the fluorescent

region.

53. The sensor of claim 51, wherein the light directed to the fluorescent region from the light transporter has a wavelength of 900 nm.

54. The sensor of claim 51, wherein the microbeam is driven to resonance by the photodiode.

55. The sensor of claim 51, wherein excitation of the microbeam comprises directing the light onto the photodiode.

56. The sensor of claim 51, wherein the shell, the microbeam and the substrate are micromachined.

57. The sensor of claim 51, wherein the sensor measures pressure within the human body.

58. The sensor of claim 51, wherein the light transporter is an optical fiber.

59. The sensor of claim 51, wherein the light transporter is an optical waveguide.